Statistics 20c_SPSS.pdf	Michael Hallstone, Ph.D. hallston@hawaii.edu

Lecture 20c: Using SPSS for Chi-Square

The purpose of this lecture is to illustrate the how to create SPSS output for Chi-Square.

Note the Goodness of Fit is not currently on the take home test. See "contingency" or "independence" test below. I write this on the test but you'd be surprised how many miss it.

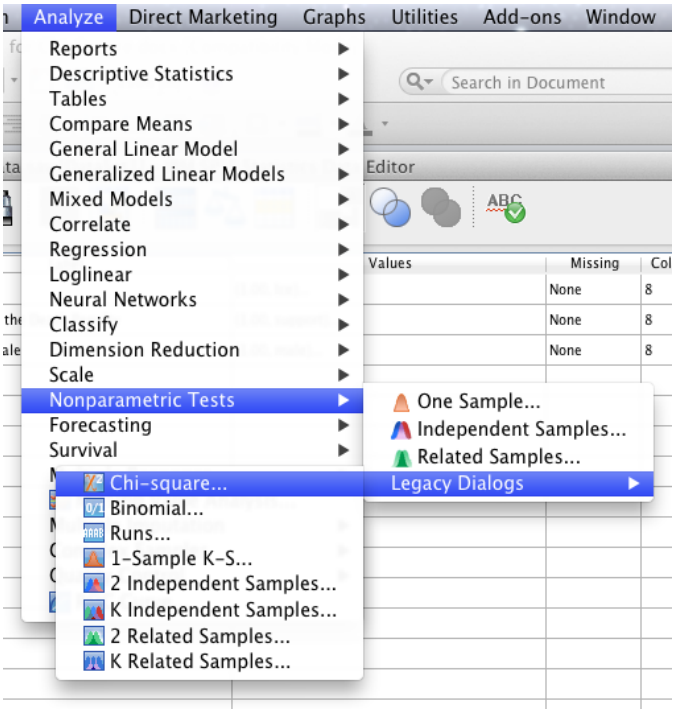
Goodness of Fit Chi-Square

Recall that a goodness of fit chi-square analyzes the distribution of a single discrete variable (chi-square is best for a nominal variable). Thus you will need a discrete variable that is preferably nominal but ordinal is okay too.

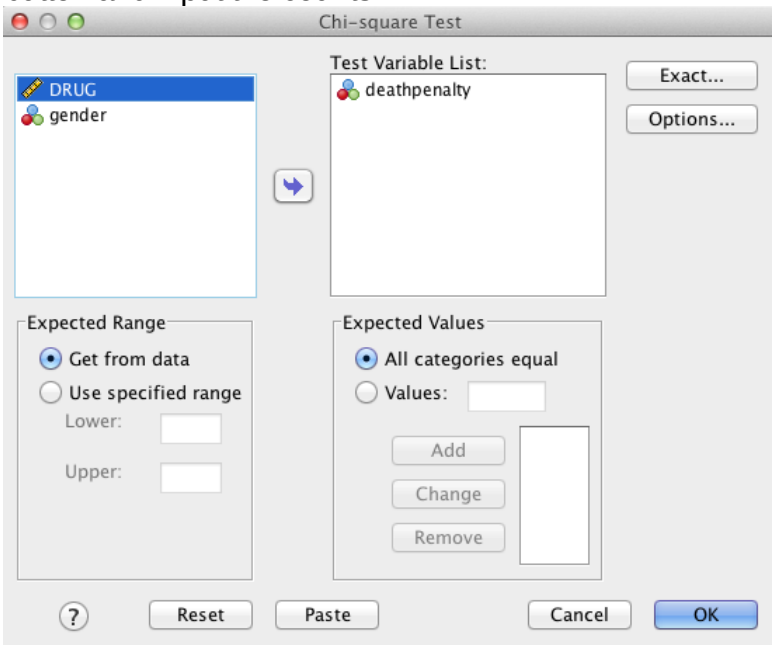
We will use the data from lecture 20. Recall in this example we look at support and opposition to the death penalty. We have a variable "Do you support or oppose the death penalty?" (1 = support the death penalty 2 = oppose the death penalty).

We are testing the theory that an equal number (or %) of people in the population support as oppose the death penalty. [That means we would expect the distribution to be 50% for category (100/2= 50%).

How to have SPSS do a chi-square "goodness of fit"



Move your variable into the **Test Variable List** box. Notice that under **Expected Values** the **All categories equal** is selected. If you wanted to test for different distribution you select the **Values** button and input the counts.



After you move your variable into the Test Variable **List box** push **OK.**

Below is the output:

Do you support the Death Penalty

	Observed N	Expected N	Residual
support	50	37.5	12.5
opppose	25	37.5	-12.5
Total	75		

Test Statistics

	Do you support the Death Penalty
Chi-Square	8.333[a]
df	1
Asymp. Sig.	.004

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 37.5.

The TR is located in the bottom box in the row that says "Chi-Square" and =8.333. The a "footnote" points to a message that says all of our cells have expected counts of at least five. If you violate this assumption, SPSS will tell you here.

Contingency Table or Test of Independence

Recall that a chi-square test of independence (or contingency table test) are the same thing and test to see if two variables are independent of each other.

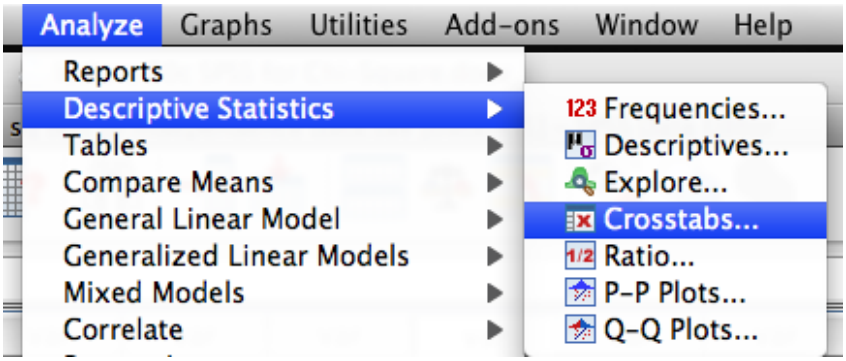
You will need two discrete variables (preferably nominal).

Using the data from lecture 20, we have two variables: gender (1=male 2= female) and a question "Do you support or oppose the death penalty?" (1 = support the death penalty 2 = oppose the death penalty).

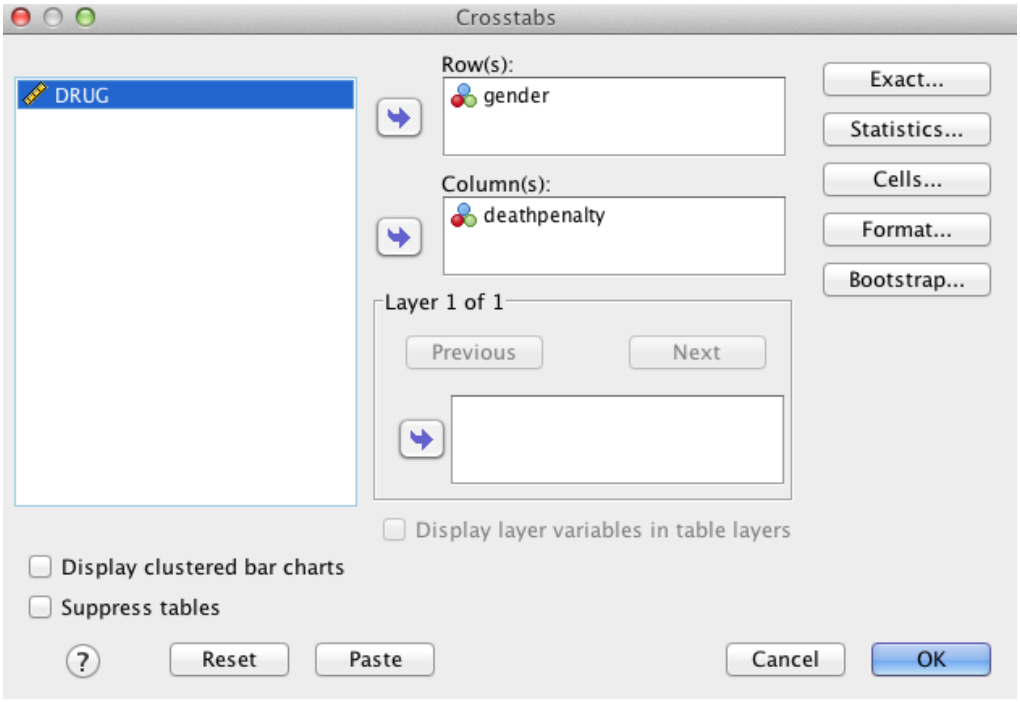
So, in plain English, we will do a Contingency Table Chi Square (or a Chi-Square Test of Independence) to test the theory that whether or not someone supports the death penalty is ***independent of or NOT related*** *to whether they identify as male or female. Or conversely, attempt do the chi-square test to prove that whether or not someone supports the death penalty is* ***dependent upon or related to*** *whether they identify as male or female.*

H_0: *whether or not someone supports the death penalty is* ***independent of or NOT related to*** *whether they identify as male or female*
H_1: *whether or not someone supports the death penalty is* ***dependent upon or related to*** *whether they identify as male or female.*

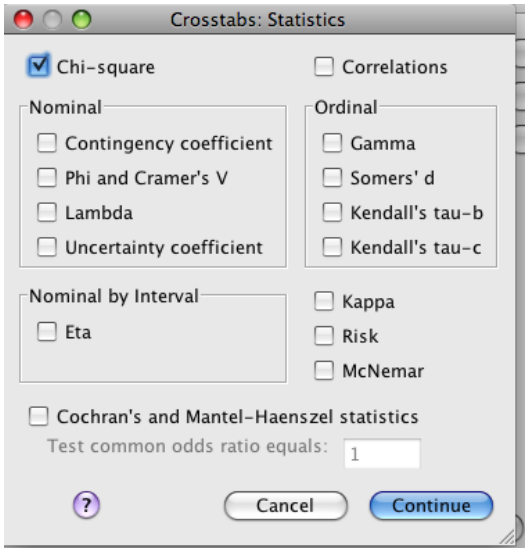
To have SPSS do a chi square test of independence



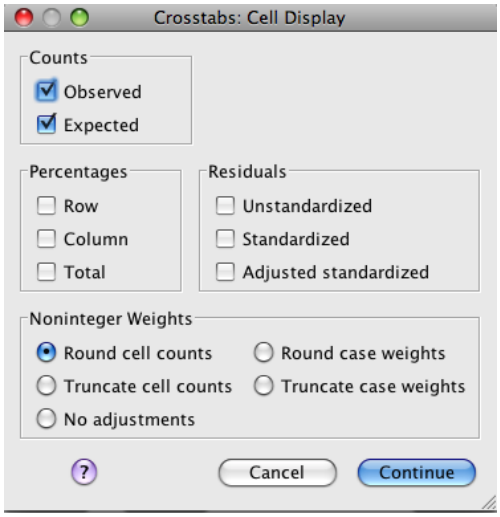
Move one of your discrete variables in to the **rows** box and one into the **columns** box [it does not matter which goes in either box].



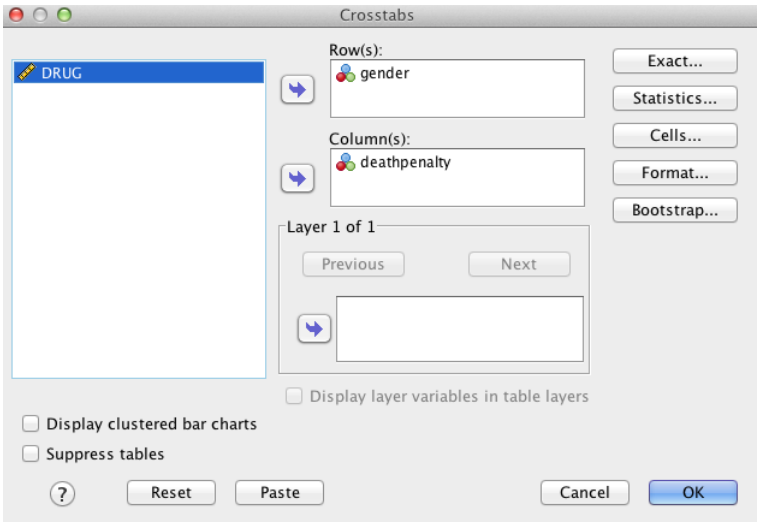
Then push the **Statistics** button and select **Chi-square** and **Continue**



Next push the **Cells** button and under **Counts** check off **Observed** and **Expected.** Then the **Continue** button.



Lastly push the **OK** button



below is the output you will see

This is the SPSS output for a chi-square test of independence

1=male 2=female * Do you support the Death Penalty Crosstabulation

			Do you support the Death Penalty		
			support	opppose	Total
1=male 2=female	male	Count	26	3	29
		Expected Count	19.3	9.7	29.0
	female	Count	24	22	46
		Expected Count	30.7	15.3	46.0
Total		Count	50	25	75
		Expected Count	50.0	25.0	75.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.244[a]	1	.001		
Continuity Correction[b]	9.621	1	.002		
Likelihood Ratio	12.504	1	.000		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	11.094	1	.001		
N of Valid Cases	75				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.67.

b. Computed only for a 2x2 table

For the TR value you look at “Pearson Chi-Square” Row under “Value.” So the TR is = 11.244. The p value is two columns over under the “Asymp. Sig. (2-sided) and is = .001.

So in lecture 20: chi square I show you the 7 steps and we wind up rejecting the null. When you leave this class just look at the p-value as “the seven steps lead to p.” When p is less than “alpha” or error we reject the null. In lecture 20 we use the “standard of the industry” or .05 or 5% error. In this case p-value=.001 and much smaller than .05 so we reject the null.

In plain English we say *whether or not someone supports the death penalty is* ***dependent upon or related to*** *whether they identify as male or female.*

What is the wording when we fail to reject the null hypothesis?

When we fail to reject the null hypothesis we say “Insufficient evidence to reject theory that _____ “ [insert Ho in plain English.] or

Insufficient evidence to reject theory that *whether or not someone supports the death penalty is* ***independent of or NOT related to*** *whether they identify as male or female*